Conformance Testing of Link 16 Message Standard based on ATC-Gen

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INTRODUCTION

- Data link is an information system which automatically receives and transmits formatted tactical data conforming to specified message standard.
- Message standard includes a set of protocols consisting of data formats, element definitions, rules, procedures, and other conventions for information exchange and related interactions to realize tactical functions.
- ATC-Gen applies M&S framework and DEVS specification to conformance testing of Link 16.
- DEVS specification is a tool that models discrete event systems modularly, hierarchically and formally. The DEVS model can be either basic or composite model.

ATC – GEN METHODOLOGY

Step 1: Rule Formalization. Translating the original rules to the formalized description language.
Step 2: Rule Analysis. Extracting the I/O state variables for single rule and determining the relation among rules by identifying shared I/O state variables.
Step 3: Test Sequence & Test Case Generation. Selection and formation of test sequences and generation of test cases from test sequences.
Step 4: Conformance Testing. Generation and implementation of DEVS test models on test driver and SUT.

MODELING AND SIMULATION

<table>
<thead>
<tr>
<th>Function</th>
<th>Quantity of test cases</th>
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<tbody>
<tr>
<td>R2</td>
<td>120 Message test 75 Rule test</td>
</tr>
<tr>
<td>Track correlation</td>
<td>135 35</td>
</tr>
<tr>
<td>Decorrelation</td>
<td>105 22</td>
</tr>
<tr>
<td>Handover</td>
<td>75 34</td>
</tr>
</tbody>
</table>

CONCLUSION

The method will reduce ambiguity of specification and be capable of improving the effectiveness and productivity of standard conformance testing.

FUTURE WORK

- Promoting automation of conformance testing process
- Applying NLP to reduce manual participation and improve automation and efficiency of testing